Technology: Modern, electronically controlled all-wheel drive for optimal efficiency

- **Petrol and diesel models feature an electronically controlled multi-plate clutch**
- **Two electric motors enable all-wheel drive in Enyaq iV family models**
- **Under normal conditions, 4×4 vehicles operate exclusively in FWD or RWD mode**

Mladá Boleslav, 17 January 2023 – Škoda Auto utilises advanced electronic control in its all-wheel-drive models for effective power transmission. Two electric motors ensure the 4×4 drive in the Enyaq iV and Enyaq Coupé iV, while an electronically controlled multi-plate clutch is used in the Octavia, Superb, Karoq and Kodiaq series. This distributes the driving power between the front and rear axles.

Johannes Neft, Škoda Auto Board Member for Technical Development, explains: "All-wheel drive helps to improve handling performance and also enhances safety – in both ICE and electric vehicles. This is not only the case in winter, for example on snow or ice, but also on wet or dry roads. Modern electronic control systems respond optimally to changing road conditions within milliseconds and ensure the vehicle remains under control. Yet wherever conditions allow, only two wheels are driven, making our all-wheel-drive models even more efficient."

ENYAQ iV family 4×4 models with an electric motor on both axles

Škoda Auto employs modern technology and two different concepts in its all-wheel-drive models. The 4×4 models in the Enyaq iV family – the 80x and RS variants – feature two electric motors, each transmitting the power to one axle. A 150 kW permanent magnet synchronous motor (PMSM) is installed on the rear axle, just like in the Enyaq iV family models with only one motor and rear-wheel drive. With an efficiency of well over 90% in most driving situations, it is highly economical. An 80 kW induction motor (IM) on the front axle also drives the front wheels when the driving situation requires it, for example in the case of low traction. The advantages include its ability to tolerate momentary overloads and minimal drag losses when disengaged. The Enyaq iV 80x version has a system output of 195 kW, while the RS iV delivers 220 kW*. Since the system does not rely on cardan shafts, clutches or differentials, there is no mechanical connection between the two axles, making it very fast and highly efficient. The electronic control of the electric motors is so rapid and smooth that any corrections made in conjunction with the assistance systems go unnoticed by the driver.

Power distribution in ICE models using a multi-plate clutch

Škoda Auto installs an electronically controlled multi-plate clutch in its ICE models with all-wheel drive. The current sixth generation is almost 0.8 kilograms lighter than its predecessor. In addition, low-friction oil, reduced bearing preload and improved internal lubrication ensure optimised efficiency and thus lower fuel consumption. An integrated control unit ensures an immediate response. Various sensors continuously monitor parameters such as wheel speed, front wheel steering angle, lateral and longitudinal vehicle acceleration, accelerator pedal position, engine speed and torque. Based on these data, the multi-plate clutch control unit calculates and coordinates the optimal torque transmission to each wheel within milliseconds. Thanks to this, Škoda's fully automatic 4×4 drive ensures the best possible traction at all times.

How the multi-plate clutch works

The control unit regulates the speed of the drive pump in the multi-plate clutch. Besides a piston pump, this also comprises an electric motor and a control valve that regulates the oil pressure in the main piston based on the pump speed. The higher the pump speed, the more drive torque the multi-plate clutch will transmit to the rear wheels. When the pump speed is low, the clutch remains open and the forces are mainly transmitted to the front axle under normal road conditions and requirements. In this case, the 4×4 model operates much like a comparable vehicle with front-wheel drive. If the system's sensors detect a change in the driving situation, for example, due to the front wheels losing traction, the oil pressure on the clutch plates is increased and the torque is also transmitted to the rear wheels to varying degrees within milliseconds. If the front wheels can no longer achieve sufficient grip, the multi-plate clutch transfers up to 90% of the drive torque to the rear axle and, if necessary, can even apportion up to 85% of the driving power to a single wheel. The electronic differential lock (EDL) on the front and rear axles also prevents individual wheels from spinning due to insufficient traction by selectively braking the affected wheel.

* Maximum electrical power 220 kW: Maximum power determined in accordance with UN-GTR.21 that can be engaged for a maximum of 30 seconds. The power available in individual driving situations depends on various factors, including the temperature outdoors, the temperature of the high-voltage battery, and its charging status, condition and physical ageing. The maximum power is only available if the temperature of the high-voltage battery is between 23 and 50°C and its charge level exceeds 88%. If these parameters are not met, the maximum power may be reduced or unavailable. The battery temperature can to a certain degree be influenced indirectly via the stationary air conditioning function, and the charge level can be set in the vehicle. The currently available power is shown on the vehicle's driving performance screen. To optimally maintain the capacity of the high-voltage battery, a charging target of 80% is recommended for everyday use (this can be changed to 100% before long-distance journeys, for example).

Contact

Vítězslav Kodym
Head of Product Communications
P +420 326 811 784
vitezslav.kodym@skoda-auto.cz

Michaela Sklenářová
Spokesperson of Product Communications
P +420 730 862 342
michaela.sklenarova@skoda-auto.cz

Škoda Media Room

skoda-storyboard.com

Download the ŠKODA Media Room app

Follow us at twitter.com/skodaautonews for the latest news. Find out all about the new Škoda models with #SkodaExploresSweden.

Škoda Auto

- is successfully steering the new decade with the Next Level – Škoda Strategy 2030.
- aims to be one of the five best-selling brands in Europe by 2030, with an attractive line-up in the entry-level segments and more
- e-models.
- is emerging as the leading European brand in important growth markets like India and North Africa.
- currently offers its customers 12 passenger-car series: the Fabia, Rapid, Scala, Octavia and Superb, as well as the Kamiq, Karoq, Kodiaq, Enyaq iV, Enyaq Coupé iV, Slavia and Kushaq.
- delivered over 731,000 vehicles to customers around the world in 2022.
- has been a member of the Volkswagen Group, one of the most successful vehicle manufacturers in the world, for 30 years.
- independently manufactures and develops not only vehicles but also components like engines and transmissions in association with the Group.
- operates at three sites in the Czech Republic and has additional production capacity in China, Russia, Slovakia and India, primarily through Group partnerships, as well as in Ukraine with a local partner.
- employs 45,000 people globally and is active in over 100 markets.